

ADDENDUM TO THE FACT SHEET  
FOR NATIONAL POLLUTANT DISCHARGE  
ELIMINATION SYSTEM (NPDES)  
PERMIT NO. WA-002261-6

I. GENERAL INFORMATION

Facility: City of Colville  
170 S. Oak  
Colville, WA 99114

II. APPLICATION REVIEW

An application for permit reissuance was submitted to the Department of Ecology (Department) on December 28, 2005, and accepted by the Department on January 20, 2006. The scope and manner of any review of an application for replacement of permit by the Department shall be sufficiently detailed as to insure the following:

- That the permittee is in substantial compliance with all of the terms, conditions, requirements and schedules of compliance of the expired permit;
- That the Department has up-to date information on the permittee's production levels; permittee's waste treatment practices; nature, content, and frequencies of permittee's discharge; either pursuant to the submission of new forms and applications or pursuant to monitoring records and reports resubmitted to the Department by the permittee; and
- That the discharge is consistent with applicable effluent standards and limitations, water quality standards, and other legally applicable requirements listed in WAC 173-220-130.

The application for the City of Colville was reviewed and indicates that no changes in the treatment characteristics of the effluent process or volume of wastewater have occurred.

III. PERMIT REAUTHORIZATION

This fact sheet addendum accompanies the draft permit, which is to be reauthorized to the City of Colville for the discharge of wastewater to the Colville River. The previous fact sheet is also part of this administrative record and explains the basis for the discharge limitations and conditions of the reauthorized permit.

The existing permit requirements, including discharge limitations and monitoring, do not need to be changed to protect the receiving water quality. The previous fact sheet addressed conditions and issues at the facility at the time when the previous permit was issued, and statements made reflected the status in 2001. Since the issuance of the current permit, the Department has not received any information which indicates that environmental impacts from the discharge that were not evaluated at the time of the last permit issuance is persuasive enough to undertake a complete renewal of the permit. The reauthorized permit is virtually identical to the previous permit issued on June 29, 2001.

The discharge limits and conditions in effect at the time of expiration of the previous permit are carried over unchanged to this reauthorized permit. Assessment of compliance and inspections of the facility during the previous permit term indicate that the facility should not be placed on a high priority for permit renewal. The Department assigns a high priority for permit renewals in situations where water quality would materially benefit from a more stringent permit during the next five-year cycle.

The permit reauthorization process, in concert with the routine renewal of high priority permits, allows the Department to reissue permits in a timely manner and minimize the number of active permits that have passed expiration dates. A system of ranking the relative significance of the environmental benefit to be gained by renewing a permit rather than reauthorizing a permit is followed during the Department's annual permit planning process. Each permit that is due for reissuance is assessed and compared with other permits that are also due for reissuance. The public is notified and input is sought after the initial draft ranking has tentatively established which permits are likely to be completely renewed and which are likely to be reauthorized. All relevant comments and suggestions are considered before a final decision is made regarding the type of reissuance for each permit.

The only changes to the previous permit are the submittal date requirements. Submittal requirements from the previous permit that were completed and submitted and do not require additional or continued assessment were removed from this permit. The submittal dates for the other standard compliance and submittal requirements that have been carried over from the past permit into this reauthorized permit have been adjusted to the proposed permit schedule. The Department considered these submittals necessary in the previous permit and no information has come forward to cause a reconsideration of the submittal requirement.

Public notice of the availability of the draft reauthorized permit is required at least 30 days before the permit is issued [Washington Administrative Code (WAC) 173-220-050]. The fact sheet and draft permit are available for review (see Appendix A—Public Involvement for more detail on the Public Notice procedures).

After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file for the permit and parties submitting comments will receive a copy of the Department's response. Comments and the resultant changes to the permit will be summarized in the fact sheet addendum, Appendix D—Response to Comments.

#### IV. RECOMMENDATION FOR PERMIT ISSUANCE

The Department proposes that this permit be issued for two and one half years.

## APPENDIX A – PUBLIC INVOLVEMENT INFORMATION

The Department has determined to reauthorize a discharge permit to the applicant listed on page 1 of this fact sheet addendum. The permit contains conditions and effluent limitations that are described in the fact sheet.

The Department will publish a Public Notice of Draft (PNOD) on \_\_\_\_\_, in \_\_\_\_\_ to inform the public that a draft permit and fact sheet are available for review. Interested persons are invited to submit written comments regarding the draft permit. The draft permit, fact sheet addendum, and fact sheet are available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments should be mailed to:

Water Quality Permit Coordinator  
Department of Ecology  
Eastern Regional Office  
4601 North Monroe Street  
Spokane, WA 99205-1295

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the 30-day comment period to the address above. The request for a hearing shall indicate the interest of the party and the reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least 30 days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific test followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from reauthorization of this permit.

The Department will consider all comments received within 30 days from the date of the PNOD indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone at (509) 329-3567, or by writing to the address listed above.



**FACT SHEET AMENDMENT #1 FOR NPDES PERMIT WA-002261-6**  
**City of Colville Wastewater Treatment Plant**

**I. GENERAL INFORMATION**

Facility Name and Address	Colville Wastewater Treatment Plant 170 South Oak Colville, WA 99114
Type of Treatment	Lagoons, upgrading to Extended Aeration/Activated Sludge
Discharge Location	Colville River Latitude: 48 32 12 N      Longitude: 117 55 04 W.
Water Body ID Number	DH01PX Old Number: WA-59-1010

**II. BACKGROUND**

The City of Colville owns and operates a lagoon-type wastewater treatment plant system which replaced a trickling filter system in 1968. The lagoons have a design average day flow of 1.2 MGD. The lagoon system has three cells having about 38 total acres of surface area with limited supplemental aeration available for treatment along with the existing chlorine disinfection system. The City has proposed constructing an activated sludge/extended aeration-type treatment plant using some of the existing lagoons as flow equalization, two secondary clarifiers, UV disinfection, and effluent storage.

In the past three years the City of Colville has replaced about 25% of the collection system in order to reduce the severe infiltration and inflow (I&I) caused by some very old sections of pipe, old connections to basement sumps, yard drains, downtown stormwater, and groundwater springs.

Colville submitted their final Facilities Plan (revised December 20, 2000) to Ecology on January 3, 2001. The Facilities Plan was approved on April 19, 2001. They also submitted an Amendment to the Facilities Plan, on April 2, 2002. The Amendment to the Facilities Plan has not yet been approved by Ecology.

**III. PERMIT MODIFICATION**

The NPDES Permit, WA-002261-1, was issued on June 29, 2001. On July 30, 2001, the City of Colville appealed the permit.

In addition to the permit appeal, Ecology received a request from the City for an amendment of the NPDES Permit (correspondence dated December 27, 2001). The City's amendment request consisted of a modification to the permit schedule, amendment to the facility plan by deletion of the advanced sludge handling facilities, and deferring some lagoon modifications. The basis for the City's amendment request was a concern about the affordability of the proposed wastewater treatment plant upgrade project. The City did include a funding application schedule with the Memorandum to Ecology, dated January 23, 2002. The Memorandum noted that the compliance schedule proposed was contingent on the availability of funding.

Prior to the scheduled appeal hearing, Ecology and the City agreed to enter into discussions regarding the permit appeal and the request for the permit amendment and facility plan modifications. Ecology and City representatives met on December 13, 2001 and January 18, 2002 to discuss the issues. The discussions resulted in modifications to the permit compliance schedule, facility plan amendments and a "Stipulation and Agreed Order of Dismissal" of the permit appeal from the Pollution Control Hearing Board, dated February 22, 2002.

#### **IV. DISCUSSION**

The City of Colville had concerns about the need for the monitoring at downstream river mile 5.0. Ecology agreed that for the interim time period the monitoring could be upstream only. Once the new facility is operational, then the City of Colville would be required to monitor the river upstream and downstream. Ecology's basis for including upstream and downstream monitoring is to confirm modeling and the potential for effluent impacts to the Colville River. The City of Colville will include a report with the next NPDES Permit application that evaluates the best monitoring location options. The best alternative would be a location where monitoring would be the best predictor of facility BOD impacts to the Colville River.

The Receiving Water and Effluents Study in Section S8 is to be deferred until the next permit cycle. In order to accurately reflect the actual facility removal rates for these parameters, the City of Colville will need to measure the metals for the influent and the effluent. Upstream metals will need to be measured as part of this study to assess the relative level of impact that the Colville facility effluent is having on the Colville River.

Therefore the "Stipulation and Agreed Order of Dismissal", dated January 25, 2002, resulted in the following permit modifications:

- a. The Final Monitoring Schedule in Permit Condition S2, Table B, was modified by removing the monitoring requirements for river mile 5.0.
- b. The Receiving Water and Effluent Metals Study was removed from Permit Condition S8.

As stated in the Stipulation and Agreed Order of Dismissal, both of these requirements may be included in the next permit cycle.

Following discussions between Ecology and City representatives, the City proposed modifications to the permit compliance schedule per the City's memorandum dated January 23, 2002. Ecology concurred with the modified compliance dates.

The Compliance Schedule as listed in Permit Condition S9 will be modified to allow for adequate preload for the site. In accordance with the memorandum, the City suggested the following compliance schedule:

- Facility Plan amendment, plans and specifications by April 1, 2002.
- Phase 1 preload plans and specifications by April 15, 2002.
- Phase 2 (main facility) and Phase 3 (lagoon modifications) plans and specifications by November 1, 2002.
- Phase 1 site preparation and preload installed by October 1, 2002.
- Phase 1 preload 30-month consolidation period complete by April 29, 2005.
- Phase 2 main facility construction completed and plant operational by July 31, 2006.
- Phase 3 lagoon modifications completed by July 31, 2007.

The memorandum included the provision that the site consolidation be re-evaluated in April 2004 and in April 2005 to determine the effectiveness of consolidation. Thus, if the 30-month consolidation period is found to be inadequate, the scheduled completion date could be extended by one year.

Ecology recognizes the City's situation with respect to funding. The City included in their January 23, 2002 Memorandum a proposed schedule to obtain funding for the project with the proviso that the schedule is contingent on the availability of funding. The Permit will list the compliance schedule in Section S9 as proposed in the City's Memorandum. Any changes in the funding situation for the City will be reviewed by Ecology for the consideration of modifying the permit compliance schedule.

The Facility Plan amendment has been submitted, however it has not yet been approved by Ecology. The Phase 1 "Preload" plans and specifications have been approved by Ecology.

The Phase 3 lagoon modifications completion date after the current permit expiration date. The completion date will be incorporated in the permit conditions for the following Colville Wastewater Treatment Plant NPDES permit.

## **V. CONCLUSION**

The Final Monitoring Schedule, Section S2, Table B, for the new wastewater treatment plant will be changed by removing the requirement for a downstream

sampling point at river mile 5.0. The downstream monitoring location will be identified prior to the next permit cycle.

Section S8 will be modified by removing the Receiving Water and Effluent Metals Study. The Study will be deferred until the next permit cycle.

Section S9, Compliance Schedule, will become Section S8 and changed to reflect the necessary preload requirements and the phasing of the project. The schedule in S8 will read as follows:

Plans and Specifications submitted for Ecology's approval:

Phase 2 -- Main Facility and Phase 3 Lagoon Modifications	November 1, 2002
Site preparation and preload installed	October 1, 2002
Site consolidation with preload complete	April 29, 2005
Phase 2 construction completed and plant operational	July 31, 2006*

\* The site consolidation will be reevaluated in April, 2004 and in April, 2005 to determine the effectiveness of the consolidation. If the thirty month consolidation is not adequate, the scheduled completion date will be extended by one year.



# **FACT SHEET FOR NPDES PERMIT WA-002261-6**

## **City of Colville**

### **SUMMARY**

The northeast Washington City of Colville has a population of about 4,700 people served by sewer and is moderately projected to exceed a population of 6,700 in less than 20 years. Water quality studies conducted by Ecology and others show that Colville River water quality seasonally violates water quality criteria for oxygen, ammonia chlorine, fecal coliform, temperature, and pH. These criteria are established to protect the river's designated beneficial uses which include cold water biota (trout) habitat, water supply, and swimming. Municipal wastewater discharged directly to the river is one of the major reasons for degraded water quality. The proposed permit gives interim effluent limits for the existing treatment plant consistent with the previous permit, but also establishes a blend of more stringent technology and water quality-based effluent limits designed to protect Colville River water quality downstream of the discharge. The new limits become effective with the completion of the new plant by no later than summer of 2006.

Colville has replaced 25 percent of its collection system to exclude excessive inflow and infiltration, but major upgrades to the treatment plant are still necessary to assure protection of downstream water quality. A draft Wastewater Facility Plan has been prepared for Ecology's approval with a design to meet the new limits. The plan proposes treatment alternatives that combine much higher levels of treatment with variable summer effluent diversion. A compliance schedule is included in the permit requiring construction of a new plant to begin by the summer of 2003 and giving the City until summer of 2006 to complete the project. The discharge permit also requires that the City continue protecting the sewer collection and treatment system from incompatible wastes and monitor the river during summer to assess the effectiveness of wastewater treatment improvements.

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## INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has delegated responsibility to administer the NPDES permit program to the State of Washington on the basis of Chapter 90.48 RCW which defines the Department of Ecology's authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the State include procedures for issuing permits (Chapter 173-220 WAC), technical criteria for discharges from municipal wastewater treatment facilities (Chapter 173-221 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the state is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A--Public Involvement of the fact sheet for more detail on the Public Notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in Appendix D--Response to Comments.

GENERAL INFORMATION	
Applicant	City of Colville
Facility Name and Address	Colville Wastewater Treatment Plant 170 South Oak Colville, WA 99114
Type of Treatment:	Lagoons upgrading to Extended Aeration/Activated Sludge
Discharge Location	Colville River – RM 14.8 Latitude: 48° 32' 12" N                      Longitude: 117° 55' 04" W.
Water Body ID Number	DH01PX Old Number: WA-59-1010

## BACKGROUND INFORMATION

### DESCRIPTION OF THE FACILITY

#### HISTORY

The City of Colville is located in northeast Washington with a population of approximately 4,700 currently served by sewer (Figure 1). The majority of its economy has historically been associated with mining, timber, and agriculture. The sewered population is expected to grow to 6700 by 2018 using a moderate growth rate (Varela & Assoc. and Esvelt Enviro. Eng., 2000). The existing lagoon-type wastewater treatment system replaced an old trickling filter system in 1968. The lagoons had a design average day flow of 1.2 MGD. Based on recommendations from previous engineering studies (EMCON 1995), the City built a new headworks structure and replaced approximately 25% of the collection system over the past three years at considerable expense. The goal of the replacement was to reduce severe infiltration and inflow (I&I) caused by some very old sections of pipe, connections to basement sumps, yard drains, downtown stormwater, and groundwater springs. Significant reductions in I&I have occurred, but large flows of I&I still exist in the system and the City has determined that it would not be cost effective to pursue further I&I removal.

The exceedance of design flows, repeated failure of the system to meet the minimum federal municipal treatment standards and degraded downstream water quality in the Colville River has resulted in the need to upgrade the treatment plant. A compliance order was issued by Ecology in 1995 requiring the City to complete construction of a new facility by December 31, 2000. The order also reflected the language of the City Council resolution limiting new sewer hook-ups to no more than 100 equivalent residential units (ERUs) per year until the wastewater system was upgraded. A draft facility plan was submitted to Ecology on June 28, 2000, which proposes construction of an activated sludge/extended aeration-type treatment plant using some of the existing lagoons as flow equalization and effluent storage. The draft plan also proposed a new compliance schedule giving the City until summer 2006 to complete construction.

#### COLLECTION SYSTEM STATUS

The City's collection system consists of approximately 125,500 feet of sewer line divided into three main basins with pump stations in two of the basins. Part of the system has been allowed to become a combined system to handle roof drains in the downtown area and to collect sump pump water from areas with high groundwater. As mentioned above, the collection system has had major repair performed on the headworks, trunk sewer, and mainlines.

#### TREATMENT PROCESSES

The existing lagoon system has 3 cells having about 38 total acres of surface area with limited supplemental aeration available for treatment along with the existing chlorine disinfection system. The new proposed facility will be an oxidation ditch-type system designed with anoxic selector tanks, two secondary clarifiers, an aerobic sludge storage basin, sludge dewatering belt press, and UV disinfection (Figure 2).

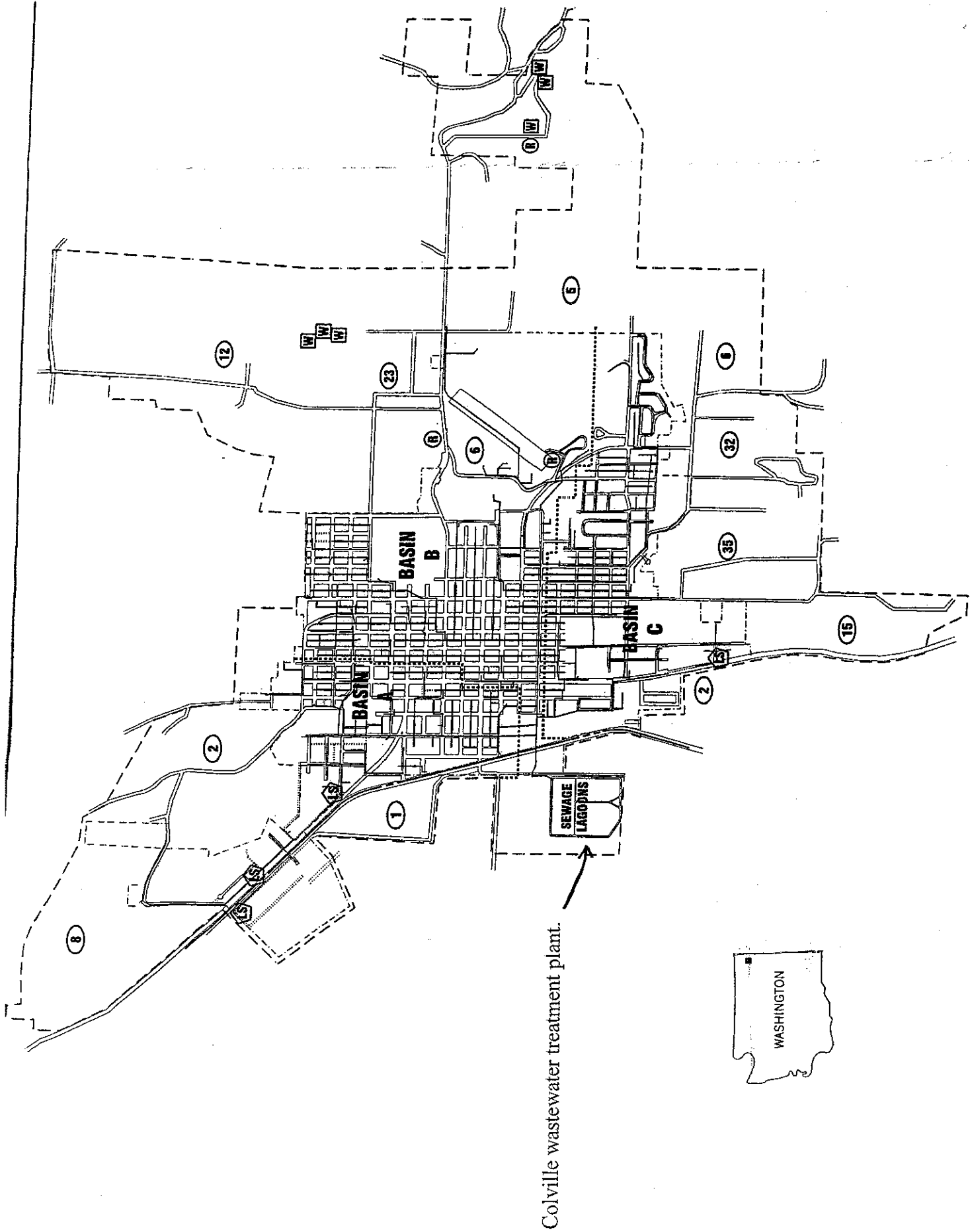


Figure 1. Location map for the City of Colville wastewater treatment lagoon

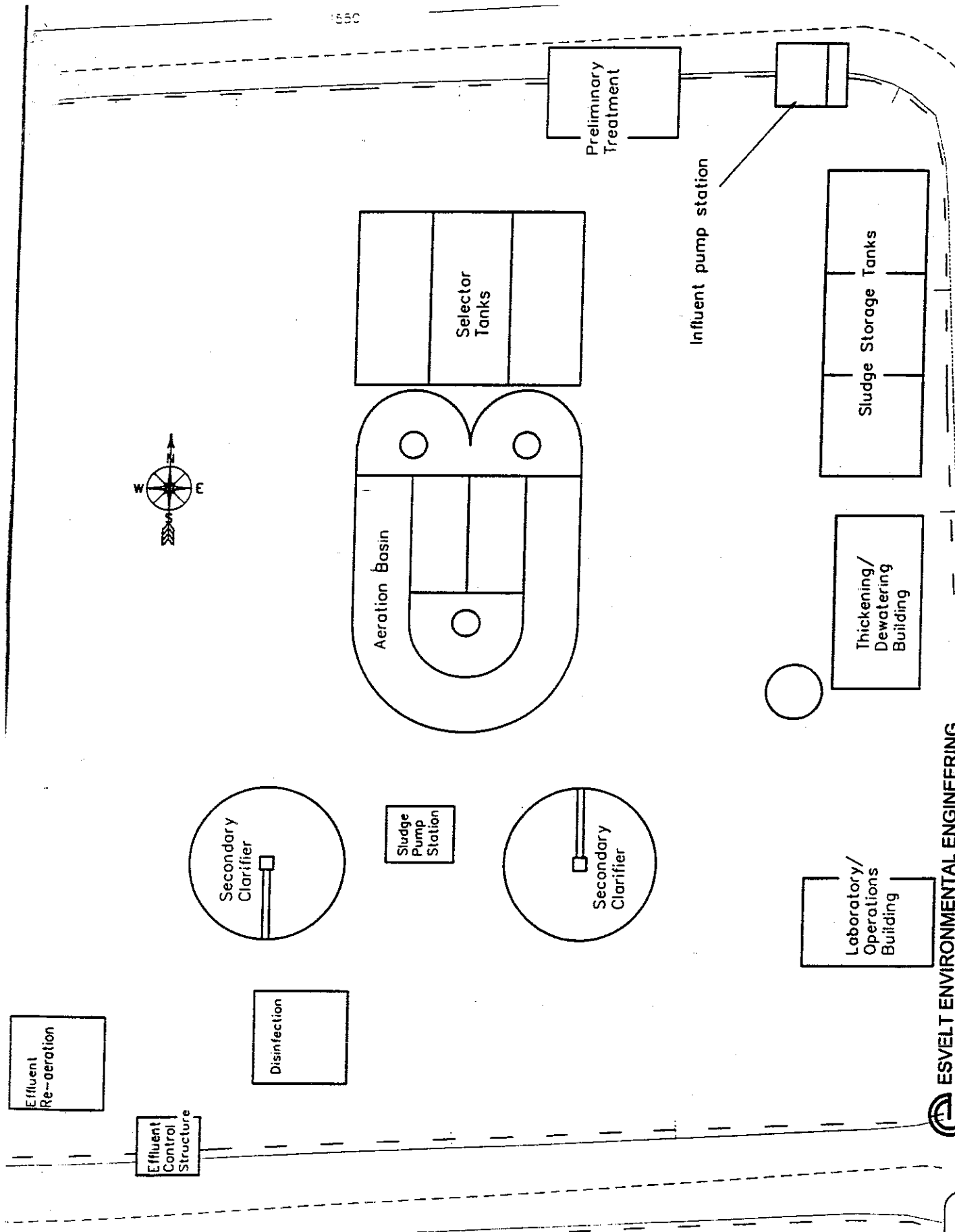


Figure 2. Plant site layout for the new Colville wastewater treatment plant.

**ESVELT ENVIRONMENTAL ENGINEERING**  
7605 East Hodin Drive., Spokane, WA 99212

**VARELA AND ASSOCIATES, INC.**  
ENGINEERING AND MANAGEMENT

SCALE: AS SHOWN  
DESIGNED: MFE  
DRAWN: MFE  
CHECKED: MFE  
APPROVED: MFE  
PROJECT NO.: 53-04-07  
DATE: 05/17/99

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*City of Colville*

After construction is completed, the remaining lagoons will be used for flow equalization and seasonal storage of treated effluent when summer low flows occur in the Colville River requiring partial diversion of the discharge from the river.

**DISCHARGE OUTFALL**

Treated effluent is discharged from the facility via a submerged pipe with no diffuser into the Colville River. Because the City's outfall was built prior to 1992, the mixing zone will be exempted from meeting the geometric restrictions, but will not be allowed to exceed the maximum allowable river volume for dilution as authorized by Chapter 173-201A-100(12). The dilution factors in the mixing zone are determined based on the maximum allowable volume of seasonal 7Q29 river flow (acute=2.5%, chronic=25%).

**RESIDUAL SOLIDS**

The treatment facilities remove solids during the treatment of the wastewater at the headworks (grit and screenings), and at the secondary clarifiers, in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. Grit, rags, scum and screenings are drained and disposed of as solid waste at the local landfill.

The existing sludge has not been removed from any of the lagoons. It is anticipated that sludge will need to be removed for part of the site preparation for the new treatment plant. Sludge from the new facility will be aerobically stored, dried, and land applied under a biosolids permit administered by Ecology's Solid Waste Program. A section on sludge treatment will be in the new O&M manual. A biosolids management plan will be required as part of the Biosolids Management Permit.

**PERMIT STATUS**

The previous permit for this facility was issued on April 30, 1990 and was administratively extended on April 28, 1995. The previous permit placed effluent limitations on 5-day Biochemical Oxygen Demand (BOD<sub>5</sub>), Total Suspended Solids (TSS), pH, Fecal Coliform bacteria, and Total Residual Chlorine. An administrative order was also issued to the City February 16, 1995, with a compliance schedule that required 1) I&I corrections to be completed by October 31, 1997, 2) a facility plan by November 30, 1998, and completion of construction by December 31, 2000. The administrative order also reflected the language of a City resolution restricting new sewer connections to 100 equivalent residential units (ERUs) per year until the treatment plant is constructed. An application for permit renewal was submitted to the Department on April 12, 1999 and accepted by the Department on April 14, 1999.

**SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT**

The facility has had trouble maintaining compliance with municipal secondary treatment standards and has likely contributed to significant water quality degradation downstream of its discharge to the Colville River. That has led to the previous compliance schedule to develop a facility plan and complete construction of the upgraded treatment plant. Because the City has spent considerable effort in fixing the collection system, funding the necessary treatment plant upgrades will be difficult. The City has taken extra time to carefully review many treatment alternatives.



## PROPOSED PERMIT LIMITATIONS

Federal and State regulations require that effluent limitations set forth in a NPDES permit must be either technology- or water quality-based. Technology-based limitations for municipal discharges are set by regulation (40 CFR 133, and Chapters 173-220 and 173-221 WAC). Water quality-based limitations are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Sediment Quality Standards (Chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992.) The most stringent of these types of limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The final limits for the new treatment plant in this permit are based in part on information received in the application, information contained in the Wastewater Facility Plan (Varela & Assoc. and Esvelt Environmental Engineering, 2000) and the Colville River Water Quality Study (Ecology, 1997). The effluent constituents in the application and facility plan were evaluated, in consultation with Ecology, on both a technology- and water quality-basis. The limits necessary to meet the rules and regulations of the State of Washington were determined and included in this permit. Ecology does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation. Effluent limits are not always developed for pollutants that may be in the discharge but not reported as present in the application. In those circumstances the permit does not authorize discharge of the non-reported pollutants. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department of Ecology. The Permittee may be in violation of the permit until the permit is modified to reflect additional discharge of pollutants.

### DESIGN CRITERIA

In accordance with WAC 173-220-150 (1)(g), flows or waste loadings shall not exceed approved design criteria. The design criteria for the new treatment facility are taken from the Wastewater Facility Plan as follows:

**Table 1: Design Standards for the new Colville WWTP.**

Parameter	Design Quantity
Design population equivalent	6701
Annual average flow	1.45 MGD
Summer average flow (June – October)	1.16 MGD
Monthly average flow (max. month)	2.83 MGD
Maximum Day flow	4.30 MGD
BOD <sub>5</sub> avg. influent loading (max. month)	2030 lbs/day
TSS avg. influent loading (max. month)	3580 lbs/day
Effluent BOD and TSS conc. (month avg./day max)	10/15 mg/L & 85% avg. removal
Effluent Ammonia conc. (month avg./day max)	1.0/2.0 mg/L

**TECHNOLOGY-BASED EFFLUENT LIMITATIONS**

Municipal wastewater treatment plants are a category of discharger for which technology-based effluent limits have been promulgated by federal and state regulations. These effluent limitations are given in the Code of Federal Regulations (CFR) 40 CFR Part 133 (federal) and in Chapter 173-221 WAC (state). These regulations are performance standards that constitute all known available and reasonable methods of prevention, control, and treatment for municipal wastewater.

The following technology-based limits for pH, fecal coliform, BOD<sub>5</sub>, and TSS are taken from Chapter 173-221 WAC are:

**Table 2: Technology-based Limits.**

Parameter	Limit
pH:	shall be within the range of 6 to 9 standard units.
Fecal Coliform Bacteria	Monthly Geometric Mean = 200 organisms/100 mL Weekly Geometric Mean = 400 organisms/100 mL
BOD <sub>5</sub> (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L
TSS (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L
Chlorine, Total Residual	Average Monthly Limit = 0.5 mg/L Average Weekly Limit = 0.75 mg/L

The technology-based monthly average limitation for chlorine is derived from standard operating practices. The Water Pollution Control Federation's Chlorination of Wastewater (1976) states that a properly designed and maintained wastewater treatment plant can achieve adequate disinfection if a 0.5 mg/liter chlorine residual is maintained after fifteen minutes of contact time. See also Metcalf and Eddy, Wastewater Engineering, Treatment, Disposal and Reuse, Third Edition, 1991. A treatment plant that provides adequate chlorination contact time can meet the 0.5 mg/liter chlorine limit on a monthly average basis. According to WAC 173-221-030(11)(b), the corresponding weekly average is 0.75 mg/liter. However, it appears that the Colville's chlorination system cannot adequately disinfect the wastewater at the above concentration. To protect public health, disinfection is required to meet the municipal secondary treatment standard for fecal coliform using the minimum amount of chlorine necessary until the new system is constructed.

In all seasons the concentration-based limits for the new facility are more stringent than those required under municipal secondary treatment standards. Based on this requirement and the new

monthly design flow, the effluent mass loading limits for BOD<sub>5</sub> and TSS, when river assimilative capacity is available, were calculated as follows:

Monthly effluent mass loadings (lbs/day) were calculated as the maximum monthly influent BOD<sub>5</sub> and TSS design loading  $2.83 \text{ MGD} \times 10 \text{ mg/L} \times 8.34 \text{ (conv. constant)} = \underline{236 \text{ lbs./day}}$ .

The weekly average effluent BOD<sub>5</sub> and TSS mass loading are calculated as  $1.5 \times \text{monthly loading} = \underline{354 \text{ lbs./day}}$ .

### *SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS*

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established Surface Water Quality Standards. The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) is a state regulation designed to protect the beneficial uses of the surface waters of the state. Water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin-wide total maximum daily loading study (TMDL).

### NUMERICAL CRITERIA FOR THE PROTECTION OF AQUATIC LIFE

"Numerical" water quality criteria are numerical values set forth in the State of Washington's Water Quality Standards for Surface Waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in receiving water while remaining protective of aquatic life. Numerical criteria set forth in the Water Quality Standards are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

### NUMERICAL CRITERIA FOR THE PROTECTION OF HUMAN HEALTH

The state was issued 91 numeric water quality criteria for the protection of human health by the U.S. EPA (EPA 1992). These criteria are designed to protect humans from cancer and other disease and are primarily applicable to fish and shellfish consumption and drinking water from surface waters.

### NARRATIVE CRITERIA

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the State of Washington.

### ANTIDegradation

The State of Washington's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural

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conditions shall constitute the water quality criteria. Similarly, when the natural conditions of a receiving water are of higher quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. More information on the State Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

The ambient background conditions obtained from river studies performed in the mid-1990s were used in the development of water quality-based limits for BOD and ammonia and used in the facility plan for consideration as design criteria. (Ecology, 1997; CH2M Hill 1996)

#### CRITICAL CONDITIONS

Surface water quality-based limits are derived for the waterbody's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic water body uses.

#### MIXING ZONES

The Water Quality Standards allow the Department of Ecology to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving all known, available, and reasonable methods of prevention, control and treatment (AKART) and in accordance with other mixing zone requirements of WAC 173-201A-100.

The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

#### DESCRIPTION OF THE RECEIVING WATER

The facility discharges to the Colville River which is designated as a Class A receiving water in the vicinity of the outfall. Characteristic uses include the following:

**Class A (Excellent)** water supply (domestic, industrial, agricultural); stock watering; fish migration; fish and shellfish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation.

Water quality of this class shall meet or exceed the requirements for all or substantially all uses.

#### SURFACE WATER QUALITY CRITERIA

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992). Surface water criteria pertinent to this discharge are summarized below:

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Fecal Coliform	100 organisms/100 mL maximum geometric mean
Dissolved Oxygen	8 mg/L minimum
Temperature	18 degrees Celsius maximum or incremental increases above background
pH	6.5 to 8.5 standard units
Turbidity	less than 5 NTUs above background
Toxics	No toxics in toxic amounts

Water quality studies in the late 1980s and early 1990s identified problems related to wastewater impacts on the Colville River. The Colville River is listed on the 303(d) list for dissolved oxygen, ammonia, chlorine, fecal coliform, temperature and pH. A basin-wide receiving water study was conducted on the Colville River in the summer of 1994 to characterize existing quality and model what kinds of water quality-based limits would need to be imposed on the point source dischargers to prevent continued violations of water quality standards. The study was important to help determine design parameters for the two new municipal treatment plants planned for construction at Colville and Chewelah, the L-Bar clean-up project, and plans to correct other significant water pollution sources. The conclusions of the study resulted in proposed water quality-based limits for BOD<sub>5</sub> and ammonia under the assumptions chosen to model critical conditions for the cities of Colville and Chewelah (Table 3). Other on-going studies are continuing to develop plans for controlling other pollution sources in the watershed also contributing to violations of the water quality standards.

#### CONSIDERATION OF SURFACE WATER QUALITY-BASED LIMITS FOR NUMERIC CRITERIA

Pollutant concentrations in the proposed discharge exceed water quality criteria with technology-based controls which the Department has determined to be AKART. A mixing zone is authorized in accordance with the percent river volume flow restriction and other restrictions for mixing zones in Chapter 173-201A WAC. Because the City's outfall was built prior to 1992, the mixing zone will be exempted from meeting the geometric restrictions as authorized by Chapter 173-201A-100(12). However, the mixing zone geometric dimensions shall be limited to a variable boundary defined by the effluent plume where the percent effluent is equivalent to that calculated from the maximum dilution factor. The dilution factor will be derived based on the maximum fraction of the river flow authorized for acute (2.5%) and chronic (25%) mixing zones at the established critical conditions.

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants--their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

~~Table 20. Summary of effluent limits for NPDES permits to meet dissolved oxygen standards in the Colville River.~~

Season	Discharger	Daily Maximum BOD5		Daily Maximum Ammonia	
		mg/L	pounds/day	mg/L as N	pounds/day
<i>Without Surface Discharge from L-Bar:</i>					
June-October	Chewelah	10	59	1.7	15
		15	89	0	0
	Colville	10	100	0.8	12
		15	150	0.4	6
November-February	Chewelah	15	150	5.7	102
		30	300	4.6	82
		45	451	3.7	66
	Colville	15	150	7.5	113
		30	300	6.8	102
		45	451	6.0	90
March-May	Chewelah	15	150	10	179
		30	300	9.6	171
		45	451	8.6	154
	Colville	15	150	13	195
		30	300	12	180
		45	451	11	165
<i>With Surface Discharge from L-Bar:</i>					
June-October	L-Bar	—	—	—	1.8
	Chewelah	10	59	0.5	4
		15	89	0	0
	Colville	10	100	1.0	15
		15	150	0.4	6
November-February	L-Bar	—	—	—	7.1
	Chewelah	15	150	5.3	95
		30	300	4.3	77
		45	451	3.2	57
	Colville	15	150	7.5	113
		30	300	6.8	102
		45	451	6.0	90
March-May	L-Bar	—	—	—	8.1
	Chewelah	15	150	9.9	177
		30	300	8.7	155
		45	451	7.9	141
	Colville	15	150	12	180
		30	300	12	180
		45	451	11	165

Table 3. Recommended water quality-based limits for the cities of Chewelah and Colville from the Colville River study (WA DOE, 1997).

The derivation of water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water. The Colville River appeared to exhibit three distinct flow scenarios (very low flow in mid-late summer, moderate flow in late fall and winter, and high flow in the spring). When considering the hydrology of the river and Ecology policy for determining critical flows, it appeared that the most flexibility for developing discharge limits that still protected water quality was obtained by dividing the river into three distinct seasons (November – February, March – May, and June – October). The critical condition for each independent season of the Colville River was determined to be the seven day average low river flow with a recurrence interval of 29 years (7Q29, WA DOE, 1997). Ambient data in the vicinity of the Colville outfall was taken from river monitoring conducted by Ecology, Stevens County Conservation District, and USGS which considered both historical data and an intensive monitoring study conducted in the late summer of 1994. The data was used to model critical conditions of river dissolved oxygen and water quality-based limits for BOD with varying concentrations of effluent ammonia. During summer critical conditions, the need to reduce effluent ammonia for the river's critical dissolved oxygen was more restrictive than toxicity-based limits for ammonia. For the spring and winter season, ammonia toxicity-based limits were more restrictive than those needed to protect dissolved oxygen, but the design criteria for effluent ammonia (1.0 mg/L monthly avg. and 2.0 mg/L daily max) is adequate to prevent ammonia toxicity in the river.

BOD<sub>5</sub>—Under critical conditions the impact of BOD on the receiving water was modeled using QUAL2E software. As a result, very restrictive seasonal-based BOD<sub>5</sub> and ammonia effluent limits were found to be necessary to be protective of the river dissolved oxygen criterion during critical (7Q29) flows. The City looked at many different treatment alternatives that could meet the new limits. All of the alternatives require that the citizens of the Colville must pay more than what normally would be considered economically reasonable using Ecology's financial aid guidelines. The preferred alternative by the City will be to treat to low levels which meet the water quality-based limits for every season except the summer. In the summer, the discharge will be diverted to storage lagoons when summer river flows are so low that the treatment cannot meet the loading limits at that flow.

Typical permit limits require that the maximum loading for the seasonal critical condition (7Q29) be met during that season regardless of actual flow in the river. However, the ability to adjust the discharge volume to provide some flexibility in management of the BOD and ammonia loading is an added control. This flow management of the discharge allows flexibility for incremental adjustment to the discharge loading while protecting river water quality using flow-based intervals for river flows above the 7Q29. Calculation of allowable loading for river flows above the 7Q29 flow was done by the City's engineer using the same model as Ecology used in the initial Colville River study and adjusting for increases in the river flow.

Modeling dissolved oxygen using the different river flows is a more flexible method for determining allowable effluent waste loads. Using the maximum daily discharge concentration (15/2/8 mg/L, BOD/NH<sub>3</sub>/DO) and the maximum allowable daily waste load at various summer river flows determined the volume of effluent that could be discharged to meet the maximum load. Actual summer permit limits were calculated using a safety factor so that the maximum allowable loading is less likely to be exceeded. This was accomplished by developing stepped

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limits that drop by about 25 percent at the point where the river flow-based discharge limit approached the maximum allowable load as river flows decrease (Figure 3). The discharge flow limits projected to meet those loads at design conditions in each bracketed river flow are as follows:

Colville River Flow (cfs, 7-day avg. @ Kettle Falls)	Daily Max Effluent Flow (MGD) to river @ 15/2/8 mg/L BOD/NH <sub>3</sub> /DO,
>70	2.42
>55 and ≤70 (7Q1 = 59.9)	1.74
>45 and ≤55	1.33
>30 and ≤45 (7Q5 = 30.6)	1.00
≤30 (7Q29 = 11.2)	0.83

Temperature—The effluent temperature during summer critical conditions is difficult to project from the new system. Typical of the water temperature in sewers systems, it is suspected that the effluent will be a lower temperature than the correlating peak summer river temperature. However, effluent and river temperature monitoring will be required so that future temperature evaluations can be made on effluent from the new plant. If effluent temperature is found to contribute to water quality violations, WQ-based permit limits will be developed in the next permit.

Fecal Coliform—Because the river has had exceedance of fecal coliform standards and dilution is minimal, the treated effluent must meet the Class A surface water standards at the end of pipe in the summer (100 FC/100mL, max. month geo. mean). During the winter, the technology-based effluent limitation for fecal coliform bacteria was used (200 max month geo. mean/400 max week geo. mean).

Toxic Pollutants--Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the Water Quality Standards for Surface Waters or from having surface water quality-based effluent limits.

The following toxics were determined to be present in the discharge: chlorine, ammonia, heavy metals, and very low levels of some organic chemicals common to municipal wastewater. However, it is anticipated that much greater treatment efficiency will be experienced with the new treatment plant. Water quality-based limits for chlorine and ammonia will prevent their toxicity. Previous metals data from Ecology's last Class 2 inspection showed that effluent was relatively low in metals at the time of sampling. No reasonable potential analysis was performed for metals and organics with the old plant data since they are not representative of the new activated sludge treatment plant effluent. The new plant will be much more efficient at removing these pollutants from the water. Annual effluent metals monitoring will be required to evaluate the future need of water quality-based metals limits. Results from further testing for other priority pollutants will be required with the next permit application to characterize the new plant's effluent quality.



# Colville WWTP Daily Maximum Effluent Discharge versus River Flow

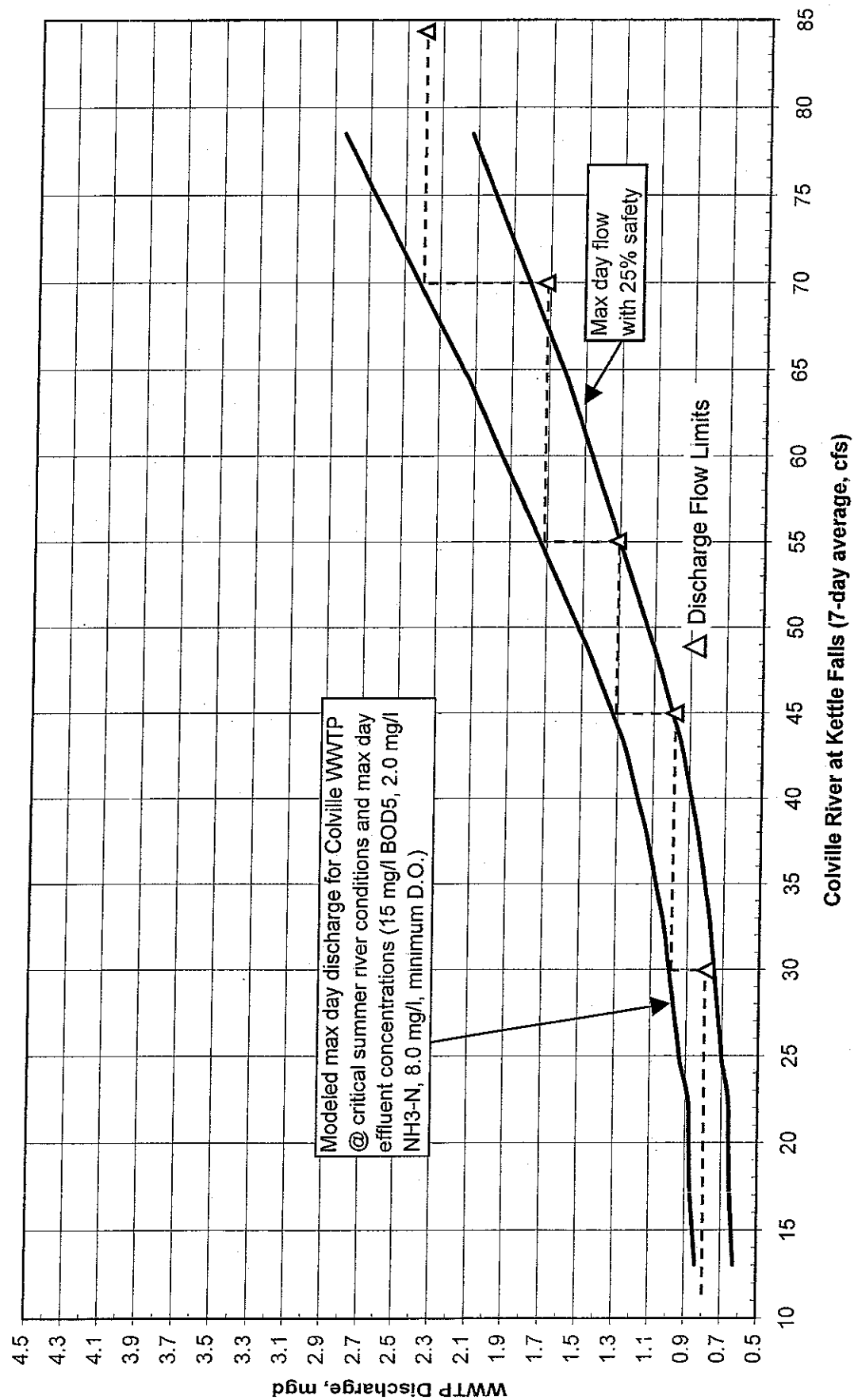


Figure 3. Colville River summer flow-based allowable loading and maximum daily discharge flow-based limits.

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**WHOLE EFFLUENT TOXICITY**

The Water Quality Standards for Surface Waters require that the effluent not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods. However, toxicity can be measured directly by exposing living organisms to the wastewater in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent, and therefore this approach is called whole effluent toxicity (WET) testing.

Toxicity caused by unidentified pollutants is not expected in the effluent from this discharge as determined by the screening criteria given in Chapter 173-205 WAC. Therefore, no whole effluent toxicity testing is required in this permit. However, more effluent quality will be obtained during this permit cycle along with assessments of the connected industrial users. Based on the new information, the Department may require effluent toxicity testing in the future if there is potential toxicity present in the effluent.

**HUMAN HEALTH**

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the state by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

The Department has determined that the applicant's discharge is undergoing water quality-based upgrades based on Department requirements and thus should be regulated for human health based criteria only after upgrades are completed. The discharge will be re-evaluated for potential impacts to human health at the next permit reissuance.

**SEDIMENT QUALITY**

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

The Department has determined that it is likely that discharge from the new facility has no reasonable potential to violate the Sediment Management Standards.

**GROUND WATER QUALITY LIMITATIONS**

The Department has promulgated Ground Water Quality Standards (Chapter 173-200 WAC) to protect uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100).

This Permittee has a potential discharge to ground from the existing lagoons. However, no limitations are required based on potential effects to ground water due to the clay soil type and close vicinity to the river.

## **MONITORING REQUIREMENTS**

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

Monitoring of sludge quantity and quality is necessary to determine the appropriate uses of the sludge. Sludge monitoring is required by the current state and local solid waste management program and also by EPA under 40 CFR 503.

The monitoring schedule is detailed in the proposed permit under Condition S.2. Specified monitoring frequencies take into account the quantity and variability of discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is generally consistent with agency guidance given in the current version of Ecology's *Permit Writer's Manual* (July 1994) for an activated sludge treatment plant < 2.0 MGD.

### ***LAB ACCREDITATION***

With the exception of certain parameters the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories*.

## **OTHER PERMIT CONDITIONS**

### ***REPORTING AND RECORDKEEPING***

The conditions of S3. are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

### ***PREVENTION OF FACILITY OVERLOADING***

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Permittee to take the actions detailed in proposed permit requirement S.4. to plan expansions or modifications before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants. Condition S.4. restricts the amount of flow.

### ***OPERATION AND MAINTENANCE (O&M)***

The proposed permit contains condition S.5. as authorized under RCW 90.48.110, WAC 173-220-150, Chapter 173-230 WAC, and WAC 173-240-080. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

*RESIDUAL SOLIDS HANDLING*

To prevent water quality problems the Permittee is required in permit condition S7. to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and State Water Quality Standards.

The final use and disposal of sewage sludge from this facility is regulated by under the jurisdiction of the Ecology's Solid Waste Program.

Requirements for monitoring sewage sludge and recordkeeping are included in Biosolids Management Permit. This information will be used by Ecology to develop or update local limits and is also required under 40 CFR 503. A Biosolids Management Plan will be required under that permit.

*PRETREATMENT*

*Federal and State Pretreatment Program Requirements*

Under the terms of the addendum to the "Memorandum of Understanding between Washington Department of Ecology and the United States Environmental Protection Agency, Region 10" (1986), the Department of Ecology (Department) has been delegated authority to administer the Pretreatment Program (i.e. act as the Approval Authority for oversight of delegated Publicly Owned Treatment Works (POTWs)). Under this delegation of authority, the Department has exercised the option of issuing wastewater discharge permits for significant industrial users discharging to POTWs which have not been delegated authority to issue wastewater discharge permits.

There are a number of functions required by the Pretreatment Program which the Department is delegating to such POTWs because they are in a better position to implement the requirements (e.g. tracking the number and general nature of industrial dischargers to the sewerage system). The requirements for a Pretreatment Program are contained in Title 40, part 403 of the Code of Federal Regulations. Under the requirements of the Pretreatment Program (40 CFR 403.8(f)(1)(iii)), the Department is required to approve, condition, or deny new discharges or a significant increase in the discharge for existing significant industrial users (SIUs) (40 CFR 403.8 (f)(1)(i)).

The Department is responsible for issuing State Waste Discharge Permits to SIUs and other industrial users of the Permittee's sewer system. Industrial dischargers must obtain these permits from the Department prior to the Permittee accepting the discharge (WAC 173-216-110(5)) (Industries discharging wastewater that is similar in character to domestic wastewater are not required to obtain a permit. Such dischargers should contact the Department to determine if a permit is required). Industrial dischargers need to apply for a State Waste Discharge Permit sixty days prior to commencing discharge. The conditions contained in the permits will include any applicable conditions for categorical discharges, loading limitations included in contracts with the POTW, and other conditions necessary to assure compliance with State water quality standards and biosolids standards.

The Department requires this POTW to fulfill some of the functions required for the Pretreatment Program in the NPDES permit (e.g. tracking the number and general nature of industrial dischargers to the sewerage system). The POTW's NPDES permit will require that all

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industrial users currently discharging process wastewater to the POTW be identified and notified of the requirement to apply for a wastewater discharge permit from the Department. None of the obligations imposed on the POTW relieve an industrial or commercial discharger of its primary responsibility for obtaining a wastewater discharge permit (if required), including submittal of engineering reports prior to construction or modification of facilities (40 CFR 403.12(j) and WAC 173-216-070 and WAC 173-240-110, et seq.).

*Wastewater Permit Required*

RCW 90.48 and WAC 173-216-040 require commercial/industrial users to obtain a permit prior to discharge of industrial waste to the Permittee's sewerage system. This provision prohibits the POTW from accepting industrial wastewater from any such dischargers without authorization from the Department.

*Requirements for Routine Identification and Reporting of Industrial Users*

The NPDES permit requires non-delegated POTWs to "take continuous, routine measures to identify all existing, new, and proposed SIUs and potential significant industrial users (PSIUs) discharging to the Permittee's sewerage system". Examples of such routine measures include regular review of business tax licenses for existing businesses and review of water billing records and existing connection authorization records. System maintenance personnel can also be diligent during performance of their jobs in identifying and reporting as-yet unidentified industrial dischargers. Local newspapers, telephone directories, and word-of-mouth can also be important sources of information regarding new or existing discharges. The POTW is required to notify an industrial discharger, in writing, of their responsibilities regarding application for a State waste discharge permit and to send a copy of the written notification to the Department. The Department will then take steps to solicit a State waste discharge permit application.

*Annual Submittal of List of Industrial Users*

This provision requires the POTW to go through the process of performing a formal Industrial User Survey and to submit a list of existing and proposed SIUs and PSIUs. This requirement is intended to update the Department on the status of industrial users in the POTW's service area.

*Duty to Enforce Discharge Prohibitions*

This provision prohibits the POTW from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer. The first portion of the provision prohibits acceptance of pollutants which cause pass through or interference. The definitions of pass through and interference are in Appendix B of the fact sheet.

The second portion of this provision prohibits the POTW from accepting certain specific types of wastes, namely those which are explosive, flammable, excessively acidic, basic, otherwise corrosive, or obstructive to the system. In addition wastes with excessive BOD, petroleum based oils, or which result in toxic gases are prohibited to be discharged. The regulatory basis for these prohibitions is 40 CFR Part 403, with the exception of the pH provisions which are based on WAC 173-216-060.

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The third portion of this provision prohibits certain types of discharges unless the POTW receives prior authorization from the Department. The discharges include cooling water in significant volumes, stormwater and other direct inflow sources, and wastewaters significantly affecting system hydraulic loading, which do not require treatment.

*SPILL PLAN*

The Department has determined that the Permittee stores a quantity of chemicals that have the potential to cause water pollution if accidentally released. The Department has the authority to require the Permittee to develop best management plans to prevent this accidental release under section 402(a)(1) of the Federal Water Pollution Control Act (FWPCA) and RCW 90.48.080.

The proposed permit requires the Permittee to develop and implement a plan for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs.

*GENERAL CONDITIONS*

General Conditions are based directly on state and federal law and regulations and have been standardized for all individual municipal NPDES permits issued by the Department.

**PERMIT ISSUANCE PROCEDURES**

*PERMIT MODIFICATIONS*

The Department may modify this permit to impose numerical limitations, if necessary to meet Water Quality Standards, Sediment Quality Standards, or Ground Water Standards, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended state or federal regulations.

*RECOMMENDATION FOR PERMIT ISSUANCE*

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to protect human health, aquatic life, and the beneficial uses of waters of the State of Washington. The Department proposes that this permit be issued for 5 years with a compliance schedule requiring the City to construct a new treatment facility and allowing interim technology-based limits until Fall of 2006 when compliance with final water quality-based effluent limits is required.

## REFERENCES FOR TEXT AND APPENDICES

EMCON 1995. Wastewater Facility Plan, Phase 1 – Collection System, City of Colville

Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.

1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington, D.C.

1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.

Metcalf and Eddy.

1991. Wastewater Engineering, Treatment, Disposal, and Reuse. Third Edition.

Tsivoglou, E.C., and J.R. Wallace.

1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

Varela & Assoc. and Esvelt Environmental Engineering 2000 (Draft). City of Colville, Wastewater Facility Plan.

Washington State Department of Ecology.

1997. Colville River Water Quality: Pollutant Loading and Recommendations for Total Maximum Daily Loads, Publication Number 96-349

Washington State Department of Ecology.

1994. Permit Writer's Manual. Publication Number 92-109

Water Pollution Control Federation.

1976. Chlorination of Wastewater.

Wright, R.M., and A.J. McDonnell.

1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(E2). (Cited in EPA 1985 op.cit.)

## **APPENDIX A--PUBLIC INVOLVEMENT INFORMATION**

The Department has tentatively determined to reissue a permit to the applicant listed on page 1 of this fact sheet. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public notice of application was published on August 13, and August 20, 1997 in Colville Statesman Examiner to inform the public that an application had been submitted and to invite comment on the reissuance of this permit.

The Department will publish a Public Notice of Draft (PNOD) on January 10, 2001, in the Colville Statesman Examiner to inform the public that a draft permit and fact sheet are available for review. Interested persons are invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents are available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments should be mailed to:

Water Quality Permit Coordinator  
Department of Ecology  
Eastern Regional Office  
4601 North Monroe Street  
Spokane, WA 99205-1295

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the thirty (30) day comment period to the address above. The request for a hearing shall indicate the interest of the party and the reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least thirty (30) days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within thirty (30) days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone, 509-456-6148, or by writing to the address listed above.



## APPENDIX B--GLOSSARY

**Acute Toxicity**--The lethal effect of a pollutant on an organism that occurs within a short period of time, usually 48 to 96 hours.

**AKART**-- An acronym for "all known, available, and reasonable methods of prevention, control, and treatment".

**Ambient Water Quality**--The existing environmental condition of the water in a receiving water body.

**Ammonia**--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

**Average Monthly Discharge Limitation** --The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month (except in the case of fecal coliform). The daily discharge is calculated as the average measurement of the pollutant over the day.

**Average Weekly Discharge Limitation** -- The highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The daily discharge is calculated as the average measurement of the pollutant over the day.

**Best Management Practices (BMPs)**--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

**BOD<sub>5</sub>**--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD<sub>5</sub> is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

**Bypass**--The intentional diversion of waste streams from any portion of a treatment facility.

**Chlorine**--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

**Chronic Toxicity**--The effect of a pollutant on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

**Clean Water Act (CWA)**--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

**Combined Sewer Overflow (CSO)**--The event during which excess combined sewage flow caused by inflow is discharged from a combined sewer, rather than conveyed to the sewage treatment plant because either the capacity of the treatment plant or the combined sewer is exceeded.

**Compliance Inspection - Without Sampling**--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

**Compliance Inspection - With Sampling**--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the percent removal requirement. Additional sampling may be conducted.

**Composite Sample**--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing a minimum of four discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots.

**Construction Activity**--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

**Continuous Monitoring** --Uninterrupted, unless otherwise noted in the permit.

**Critical Condition**--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

**Dilution Factor**--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

**Engineering Report**--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

**Fecal Coliform Bacteria**--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

**Grab Sample**--A single sample or measurement taken at a specific time or over as short period of time as is feasible.

**Industrial User**-- A discharger of wastewater to the sanitary sewer which is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

**Industrial Wastewater**--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

**Infiltration and Inflow (I/I)**--"Infiltration" means the addition of ground water into a sewer through joints, the sewer pipe material, cracks, and other defects. "Inflow" means the addition of precipitation-caused drainage from roof drains, yard drains, basement drains, street catch basins, etc., into a sewer.

**Interference** -- A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal and;

Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

**Major Facility**--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

**Maximum Daily Discharge Limitation**--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

**Method Detection Level (MDL)**--The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

**Minor Facility**--A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

**Mixing Zone**--A volume that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in State regulations (Chapter 173-201A WAC).

**National Pollutant Discharge Elimination System (NPDES)**--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

**Pass through** -- A discharge which exits the POTW into waters of the State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

**pH**--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

**Potential Significant Industrial User**--A potential significant industrial user is defined as an Industrial User which does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

- a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day or;
- b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

The Department may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

**Quantitation Level (QL)**-- A calculated value five times the MDL (method detection level).

**Significant Industrial User (SIU)**--

- 1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N and;
- 2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority\* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)).

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority\* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

\*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

**State Waters**--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, wetlands, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

**Stormwater**--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

**Technology-based Effluent Limit**--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

**Total Suspended Solids (TSS)**--Total suspended solids are the particulate materials in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

**Upset**--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

**Water Quality-based Effluent Limit**--A limit on the concentration or mass of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

## APPENDIX C--RESPONSE TO COMMENTS

### *Comment 1*

Permit limits are not consistent with the facility plan and the City requests that the winter limits of the permit be modified to be consistent with the Esvelt memo dated February 1, 2001.

### *Response 1*

The originally proposed permit limits were consistent with the effluent design criteria presented in the draft facility plan (Table 10-2). It appears that reconsideration of the design criteria by the City has resulted in a decrease in expected winter performance for ammonia and BOD removal. A revised performance criteria could be acceptable as long as municipal secondary treatment standards are achieved, WQ-based permit limits are met, and the plant is operated consistent with the approved O&M manual. After review of several Esvelt technical memos, and further discussion about winter WQ modeling, it appears appropriate seasonal WQ-based permit limits can be met and will assure that receiving water criteria will be met. The newly proposed limits are based on modified effluent design criteria which will also need to be changed in the facility plan.

Winter permit limits will be generally based on the justification for the new proposed WQ-based limits in memos received from Mark Esvelt (copies attached). These memos further clarify the WQ modeling discussion previously submitted as permit comments by the City. The new winter WQ-based limits will appear to be protective for an extremely low 7Q29 winter flow with revised D.O.- dependant ammonia limits which are more stringent than toxicity-based limits at this flow. The winter low flow limits will become effective when the river reaches the winter season 7Q10 flow (<58 cfs @ Kettle Falls) well before the river reaches the lower 7Q29 flow. New high flow winter limits were derived for when the river was above the winter season 7Q10 flow (7-day average  $\geq$  58 cfs @ Kettle Falls). The less stringent high flow effluent limits should protect water quality at the higher river flows because dissolved oxygen and ammonia impacts from the effluent are greatly reduced mostly because of higher dilution and in-stream reaeration rates. The proposed ammonia toxicity limit was slightly reduced from the City proposals to roughly account for discrepancies in the effluent pH used for the recent modeling (7.5 vs 7.8) compared the permitted pH. The requirement for 85 percent removal of influent BOD and TSS average concentrations will be in effect throughout the year. The revised winter/spring high flow limits will be as follows:

**FINAL EFFLUENT LIMITATIONS<sup>a</sup> - WINTER/SPRING (NOVEMBER – MAY)****COLVILLE RIVER FLOW  $\geq$  58 7-DAY AVG CFS @ KETTLE FALLS**

Effective when plant is operational, but no later than November 1, 2006

<b>Parameter</b>	<b>Average Monthly</b>	<b>Maximum Daily<sup>d</sup></b>
Biochemical Oxygen Demand <sup>b</sup> (5 day)	30 mg/L	45 mg/L
Total Suspended Solids <sup>b</sup>	30 mg/L	45 mg/L
Fecal Coliform Bacteria (cfu)	200 /100 mL	400 /100 mL (weekly geo. mean)
pH <sup>c</sup>	Daily minimum is equal to or greater than 6.5 and the daily maximum is less than or equal to 7.8.	
Chlorine, Total Residual	None detected using a method detection limit of 10 $\mu$ g/L	
Dissolved Oxygen		3.0 mg/L (minimum daily)
Ammonia (Total as N)	5.0 mg/L	10.0 mg/L

The revised winter/spring low flow limits are as follows:

FINAL EFFLUENT LIMITATIONS <sup>a</sup> - WINTER/SPRING (NOVEMBER – MAY)		
COLVILLE RIVER FLOW < 58 CFS @ KETTLE FALLS		
Effective when plant is operational, but no later than November 1, 2006		
Parameter	Average Monthly	Maximum Daily <sup>d</sup>
Biochemical Oxygen Demand <sup>b</sup> (5 day)	10 mg/L, 236 lbs/day	15 mg/L, 354 lbs/day
Total Suspended Solids <sup>b</sup>	10 mg/L, 236 lbs/day	15 mg/L, 354 lbs/day
Fecal Coliform Bacteria (cfu)	200 /100 mL	400 /100 mL (weekly geo. mean)
pH <sup>c</sup>	Daily minimum is equal to or greater than 6.5 and the daily maximum is less than or equal to 7.8.	
Chlorine, Total Residual	None detected using a method detection limit of 10 µg/L	
Dissolved Oxygen		3.0 mg/L (minimum daily)
Ammonia (Total as N)	2.2 mg/L	5.5 mg/L

*Comment 2*

The proposed monitoring requirements are a significant increase over past requirements. The City requests that the monitoring requirements stay the same as the previous permit.

*Response 2*

The proposed monitoring is the *minimum* recommended monitoring by the Water Quality Program Permit Writer's Manual for wastewater facilities similar to the City's existing system. The proposed language will remain unchanged.

*Comment 3*

The City believes that monitoring of the river should not be required of the City.

*Response 3*

Monitoring of the river is needed to better characterize the river under various seasonal conditions and future effluent quality that was not available in the initial study. Better data and modeling may show that assimilative capacity in each season may allow more flexibility than



*FACT SHEET FOR NPDES PERMIT WA-002261-1*  
*City of Colville*

originally anticipated. This is important as WQ standards and wastewater facilities change over time. Ecology has attempted to keep the monitoring to the minimum necessary. The proposed language will remain unchanged.

*Comment 4*

The City would like further clarification of the flow measurement requirements needed in the permit.

*Response 4*

The required flow monitoring and permit conditions were formatted with the assumption that the river flows would be readily obtainable from the existing Kettle Falls gage. If it becomes unreasonable to obtain flows at the Kettle Falls site, the City will need to develop some other way to accurately measure river flow and use the appropriate conversion factor for determining river flow near the mixing zone.

*Comment 5*

The City believes that the proposed treatment plant is incorrectly classified as a Class 3 facility with an unnecessary requirement that it be operated by a Group 3 certified operator. The proposed language will remain unchanged.

*Response 5*

The regulations for operator certification show that any activated sludge plant with a design flow greater than 1 mgd and less than, or equal to, 10 mgd is a Class 3 treatment plant requiring a Group 3 certified operator. It also shows that an aerated lagoon system with a design flow >1 mgd, such as the existing facility at Colville, is a Class 2 treatment plant. The proposed language will remain unchanged.

*Comment 6*

The City requests that the requirements be eliminated for a receiving water and effluent metals study.

*Response 6*

The metals data is very limited for both the river and effluent. Development of local limits and a good source control for metals will be very critical to the City's future ability to control toxicity of the effluent. River and effluent data is necessary to characterize both and determine the level of control necessary to prevent toxicity. Typically having data that are more accurate with

*FACT SHEET FOR NPDES PERMIT WA-002261-1*  
*City of Colville*

several samples will give the best estimate of action that needs to be implemented and the basis used for local limits. The proposed language will remain unchanged.

*Comment 7*

The City requests that the fact sheet include flexibility in the language describing the proposed design.

*Response 7*

The fact sheet reflects what is presented in the facility plan. If the facility plan is modified and approved, the permit will need to be also modified as appropriate at that time. The proposed language will remain unchanged.



Water Quality & Treatment / Wastewater Treatment: Studies, Design, Operation / Industrial Wastewater Management

## ESVELT ENVIRONMENTAL ENGINEERING

### Memorandum

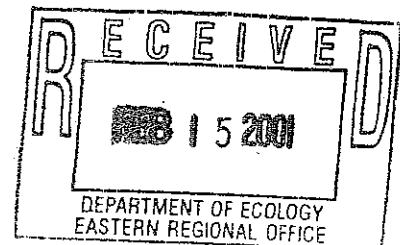
To: Mark Freiburger, P.E.,  
Harlan Elsasser, P.E.

From: Mark Esvelt, P.E. *me*

CC: Dana Cowger, Varela and Associates

Date: 2/01/01

Re: Colville WWTP winter and spring water quality based effluent limits



This memorandum provides supporting information for establishing winter and spring season water quality based effluent limits for ammonia and dissolved oxygen from the Colville wastewater treatment plant. To limit the complexity of the NPDES permit, it is proposed that the winter and spring seasons be combined, consistent with the draft permit. The more restrictive requirements for protecting water quality criteria during each season will be the proposed limits for the combined season.

Protection of water quality criteria (specifically dissolved oxygen) when river flows are at the seasonal (November-February) 7Q29 low flow require costly treatment to levels beyond technology-based secondary treatment standards. It is expected that the levels required for BOD<sub>5</sub>, TSS, and NH<sub>3</sub>-N cannot be consistently met during cold weather seasons when there is the potential for high wastewater flows. High wastewater flows are unlikely to occur, however, when river flows are very low because the same weather events affect flows for both wastewater and the river. It is therefore recommended that the allowable loads calculated from the QUAL2E model using 7Q29 as critical low flows be incorporated into the permit when river flows are low.

At higher river flows (more that the November-February seasonal 7Q10), however, secondary treatment standards will easily protect water quality criteria, so these technology-based standards should apply. This is an economically sound application of treatment technology which would be protective of water quality criteria at all times. The ammonia limit at these flows is governed by the toxicity criteria rather than the dissolved oxygen criteria.

The calculated 7Q10 flow for November-February at the Kettle Falls Gage is 58 cfs (including the effluent from wastewater treatment plants at Chewelah and Colville). The recommended effluent design criteria (and permit limits once the plant is



operational) are as follows, incorporating different limits which depend on river flow, as measured at the Kettle Falls Gage:

@ 3.0 mg/L

Parameter	Average Monthly		Average Weekly	
Colville River Flow (cfs, 7-day avg @ Kettle Falls)	<58 <i>7Q29 Based</i>	≥58	<58	≥58
BOD <sub>5</sub>	10 mg/l	30 mg/l	15 mg/l	45 mg/l
TSS	10 mg/l	30 mg/l	15 mg/l	45 mg/l
Fecal Coliform Bacteria (cfu)	200/100 ml	200/100 ml	400/100 ml	400/100 ml
Ammonia (Total as N) <sup>a</sup>	2.2 mg/l	5.4 mg/l	5.5 mg/l (maximum daily)	10.9 mg/l (maximum daily)

Notes:

- <sup>a</sup> Ammonia limits for river flows < 58 cfs based on protecting D.O. criteria with BOD<sub>5</sub> maximum day limit of 15 mg/l. For river flows ≥58 cfs, the ammonia limit is based on toxicity criteria.

The above recommended design criteria and limits were found using the following procedures to evaluate the effects of Colville WWTP effluent on Colville River water quality.

The QUAL2E model of the Colville River, as developed by Ecology, was used to assess the effects of different concentrations of pollutants in the effluent. Model discussion, critical conditions, assumptions, and approach are discussed in depth in the Department of Ecology's January, 1997 publication<sup>1</sup>. The input files for the critical conditions in each season (Winter, November-February and Spring, March-May) were provided by Ecology for use in this evaluation and are printed out in Appendix D of the Ecology publication. These critical conditions included river parameters defining critical conditions, which included low flows for each season calculated as the 7-day average low flow with a recurrence interval of once every 29 years (7Q29). The Ecology modeling effort used existing effluent parameters in predicting water quality. This evaluation went one step further, by modeling water quality based on the predicted effluent from the new facilities as presented in the facilities plan.

<sup>1</sup> Colville River Water Quality: Pollutant Loading and Capacity Recommendations for Total Maximum Daily Loads. Washington State Department of Ecology, Publication No. 96-349. Olympia, WA, January, 1997.



The model input files provided by Ecology were modified to include point-source loads from the WWTPs at Chewelah and Colville. No other modifications were made initially. Chewelah effluent flow, D.O., BOD, and ammonia used in the model were consistent with assumptions and conclusions from the 1997 Ecology Report, and adjusted to reflect design criteria presented in the Chewelah Wastewater Facilities Plan. For Colville effluent, design maximum daily flow and BOD (15 mg/l BOD<sub>5</sub> when river flows are low) were used, along with 3.0 mg/l D.O.

The model was run using the 7Q29 seasonal low flow for both winter and spring seasons. Effluent ammonia values were varied for multiple model runs to determine the allowable load which would protect water quality criteria. The modeling showed that critical conditions for the November-February season were most restrictive, and the allowable limits are listed in the table above for river flows less than 58 cfs.

The model was then revised by adjusting river flow to the seasonal (November-February) 7Q10. No other changes were made to the critical conditions of the river. This revised model was used with secondary treatment criteria effluent (45 mg/l maximum weekly BOD<sub>5</sub>), and again run multiple times to find allowable ammonia load which would be protective of the dissolved oxygen criteria. The allowable ammonia in this scenario was found to be 17 mg/l. The ammonia toxicity criteria was then checked to determine if it would be more strict.

The Ecology publication described critical conditions for calculating ammonia toxicity, and Appendix E presented a summary of the calculations. The same method was used here, including making use of Ecology's spreadsheet PHMIX. The spreadsheet calculation sheet is attached, re-created in the same format as found in Appendix E of the 1997 Ecology Report. Ammonia toxicity criteria was found to be more restrictive than the dissolved oxygen criteria for the 7Q10 flow. At the 7Q29 flow, dissolved oxygen criteria is more restrictive. These conclusions are reflected in the recommended limits in the above table.

An ammonia limit reflective of the toxicity criteria is significantly lower than one required for protection of the D.O. standard (by 36%). At the 7Q10 flow, the model predicts a dissolved oxygen level 0.62 mg/l above the water quality criteria. This margin of safety increases as flows increase. At flows below the 7Q10, the recommended limits protect water quality at 7Q29 flows and critical conditions in the river.

#### Effluent Dissolved Oxygen, Winter and Spring

The effect of dissolved oxygen (D.O.) in the Colville WWTP effluent was evaluated using the QUAL2E model. The assumption for effluent D.O. used in the 1997 Ecology report is valid, with 3.0 mg/l D.O. being representative of effluent from an extended aeration activated sludge plant without effluent reaeration. Using the QUAL2E model, from November - February and March - May, the diurnal minimum D.O. in the river is consistently higher than the Class A standard of 8.0 mg/l. For these periods, Colville WWTP effluent D.O. of 3.0 is predicted to protect this standard under the critical conditions described in the Ecology publication (including 7Q29 river flow).





Colville Facilities Permit Limits  
 Esvelt Environmental Engineering  
 2/01/01

The model runs described above in determining allowable ammonia load were all done with an effluent D.O. from the Colville WWTP of 3.0 mg/l. Ammonia levels which could be met with the proposed facilities were found protective of the D.O. standard, so additional runs with variable D.O. were not necessary.



ammonia toxicity calculations for Colville WWTP				
	31-Jan-01	@7Q29	@7Q29	@7Q10
		nov-feb	mar-may	nov-feb
upstream river flow	cfs	32.9	72.1	50.5
upstream temperature	degrees C	5.7	13.8	5.7
upstream pH	std units	8.2	7.7	8.2
upstream alkalinity	mg/l as CaCO3	190	190	190
upstream ammonia	mg/l as total NH3-N	0.12	0.076	0.12
effluent acute design flow	mgd	4.3	4.3	4.3
effluent chronic design flow	mgd	2.83	2.83	2.83
effluent temperature	degrees C	10	15	10
effluent pH	std units	7.5	7.5	7.5
effluent alkalinity	mg/l as CaCO3	283	283	283
fraction of river flow for acute DF	dimensionless	0.025	0.025	0.025
fraction of river flow for chronic DF	dimensionless	0.25	0.25	0.25
acute DF	dimensionless	1.12	1.27	1.19
chronic DF	dimensionless	2.88	5.12	3.88
acute mixing zone temperature	degrees C	9.53	14.74	9.31
acute mixing zone pH	std units	7.53	7.53	7.55
chronic mixing zone temperature	degrees C	7.19	14.03	6.81
chronic mixing zone pH	std units	7.78	7.64	7.84
acute ammonia criteria	mg/l as total NH3-N	12.288	11.899	12.065
chronic ammonia criteria	mg/l as total NH3-N	2.006	2.131	1.798
acute ammonia WLA	mg/l as total NH3-N	13.79	15.10	14.33
chronic ammonia WLA	mg/l as total NH3-N	5.55	10.59	6.63
daily max ammonia concentration limit	mg/l as total NH3-N	9.12	15.10	10.90
monthly average ammonia concentration limit	mg/l as total NH3-N	4.54	7.53	5.43
daily max ammonia load limit	ppd as total NH3-N	326.9	541.6	390.9
monthly average ammonia load limit	ppd as total NH3-N	107.3	177.7	128.2



## **Memorandum**

Attachment to Facilities Plan Technical memorandum TMEE-10a.

To: Mark Freiburger, P.E.,  
Harlan Elsasser, P.E.

From: Mark Esvelt, P.E.

CC: Dana Cowger, Varela and Associates

Date: 2/01/01  
Revised 3/22/01

Re: Colville WWTP winter and spring water quality based effluent limits

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This memorandum provides supporting information for establishing winter and spring season water quality based effluent limits for ammonia and dissolved oxygen from the Colville wastewater treatment plant. To limit the complexity of the NPDES permit, it is proposed that the winter and spring seasons be combined, consistent with the draft permit. The more restrictive requirements for protecting water quality criteria during each season will be the proposed limits for the combined season.

Protection of water quality criteria (specifically dissolved oxygen) when river flows are at the seasonal (November-February) 7Q29 low flow require costly treatment to levels beyond technology-based secondary treatment standards. It is expected that the levels required for BOD<sub>5</sub>, TSS, and NH<sub>3</sub>-N cannot be consistently met during cold weather seasons when there is the potential for high wastewater flows. High wastewater flows are unlikely to occur, however, when river flows are very low because the same weather events affect flows for both wastewater and the river. It is therefore recommended that the allowable loads calculated from the QUAL2E model using 7Q29 as critical low flows be incorporated into the permit when river flows are low.

At higher river flows (more than the November-February seasonal 7Q10), however, secondary treatment standards will easily protect water quality criteria, so these technology-based standards should apply. This is an economically sound application of treatment technology which would be protective of water quality criteria at all times. The ammonia limit at these flows is governed by the toxicity criteria rather than the dissolved oxygen criteria.

The calculated 7Q10 flow for November-February at the Kettle Falls Gage is 58 cfs (including the effluent from wastewater treatment plants at Chewelah and Colville.) The recommended effluent design criteria (and permit limits once the plant is operational) are

as follows, incorporating different limits which depend on river flow, as measured at the Kettle Falls Gage:

<b>FINAL EFFLUENT LIMITATIONS – WINTER/SPRING (NOVEMBER – MAY)</b>				
<b>Parameter</b>	<b>Average Monthly</b>		<b>Average Weekly</b>	
Colville River Flow (cfs, 7-day avg. @ Kettle Falls)	<58	≥58	<58	≥58
BOD <sub>5</sub>	10 mg/l	30 mg/l	15 mg/l	45 mg/l
TSS	10 mg/l	30 mg/l	15 mg/l	45 mg/l
Fecal Coliform Bacteria (cfu)	200/100 ml	200/100 ml	400/100 ml	400/100 ml
Ammonia (Total as N) <sup>a</sup>	2.2 mg/l	5.4 mg/l	5.5 mg/l (maximum daily)	10.9 mg/l (maximum daily)

Notes:

- <sup>a</sup> Ammonia limits for river flows < 58 cfs based on protecting D.O. criteria with BOD<sub>5</sub> maximum day limit of 15 mg/l. For river flows ≥58 cfs, the ammonia limit is based on toxicity criteria.

The above recommended design criteria and limits were found using the following procedures to evaluate the effects of Colville WWTP effluent on Colville River water quality.

The QUAL2E model of the Colville River, as developed by Ecology, was used to assess the effects of different concentrations of pollutants in the effluent. Model discussion, critical conditions, assumptions, and approach are discussed in depth in the Department of Ecology's January, 1997 publication<sup>1</sup>. The input files for the critical conditions in each season (Winter, November-February and Spring, March-May) were provided by Ecology for use in this evaluation and are printed out in Appendix D of the Ecology publication. These critical conditions included river parameters defining critical conditions, which included low flows for each season calculated as the 7-day average low flow with a recurrence interval of once every 29 years (7Q29). The Ecology modeling effort used existing effluent parameters in predicting water quality. This evaluation went one step further, by modeling water quality based on the predicted effluent from the new facilities as presented in the facilities plan.

The model input files provided by Ecology were modified to include point-source loads from the WWTPs at Chewelah and Colville. No other modifications were made initially.

<sup>1</sup> Colville River Water Quality: Pollutant Loading and Capacity Recommendations for Total Maximum Daily Loads. Washington State Department of Ecology, Publication No. 96-349. Olympia, WA, January, 1997.

Chewelah effluent flow, D.O., BOD, and ammonia used in the model were consistent with assumptions and conclusions from the 1997 Ecology Report, and adjusted to reflect design criteria presented in the Chewelah Wastewater Facilities Plan. For Colville effluent, design maximum daily flow and BOD (15 mg/l BOD<sub>5</sub> when river flows are low) were used, along with 3.0 mg/l D.O.

The model was run using the 7Q29 seasonal low flow for both winter and spring seasons. Effluent ammonia values were varied for multiple model runs to determine the allowable load which would protect water quality criteria. The modeling showed that critical conditions for the November-February season were most restrictive, and the allowable limits are listed in the table above for river flows less than 58 cfs.

The model was then revised by adjusting river flow to the seasonal (November-February) 7Q10. No other changes were made to the critical conditions of the river. This revised model was used with secondary treatment criteria effluent (45 mg/l maximum weekly BOD<sub>5</sub>), and again run multiple times to find allowable ammonia load which would be protective of the dissolved oxygen criteria. The allowable ammonia in this scenario was found to be 17 mg/l. The ammonia toxicity criteria was then checked to determine if it would be more strict.

The Ecology publication described critical conditions for calculating ammonia toxicity, and Appendix E presented a summary of the calculations. The same method was used here, including making use of Ecology's spreadsheet PHMIX. The spreadsheet calculation sheet is attached, re-created in the same format as found in Appendix E of the 1997 Ecology Report. Ammonia toxicity criteria was found to be more restrictive than the dissolved oxygen criteria for the 7Q10 flow. At the 7Q29 flow, dissolved oxygen criteria is more restrictive. These conclusions are reflected in the recommended limits in the above table.

**Note regarding margin of safety in protecting water quality criteria:**

For the proposed limits tabulated above, margin of safety in protecting water quality standards are as follows:

1. For winter/spring flows at exactly 58 cfs, the ammonia toxicity standards are protected with margin of safety built in to Ecology's method of determining ammonia limits for protecting this standard. D.O. has additional margin of safety because ammonia concentration is governed by ammonia toxicity criterion rather than D.O. Allowable ammonia concentration is 36% lower than would be allowed to protect D.O. alone. (10.9 mg/l versus 17 mg/l). Modeling river D.O. with effluent ammonia at the proposed (toxicity criteria based) concentration results in D.O. prediction 0.62 mg/l higher than the standard.
2. For winter/spring flows greater than 58 cfs, proposed effluent concentration limits would provide the margin of safety as described in number 1 above, plus any additional margin of safety due to the increased assimilative capacity of the stream due to higher flows.
3. For winter/spring flows less than 58 cfs, the proposed effluent concentration limits are reduced to the levels protecting water quality criteria for the estimated November-February 7Q29 (approximately 42.8 cfs at the Kettle Falls gage

including design discharges from POTWs) and other November-February critical conditions as presented in Ecology's 1997 report. This is a margin of safety of approximately 36% of the river flow contributing to assimilative capacity. It was found that this would be protective of water quality criteria for the March-May portion of the winter/spring season (which would have allowed 82% higher ammonia concentration). Thus, protection of water quality standards occurs at the critical conditions per Ecology policy for seasonal discharges, with added margin of safety because the partial season critical conditions were used in the model to determine allowable concentrations.

#### **Effluent Dissolved Oxygen, Winter and Spring**

##### **Effluent Re-aeration is not necessary in winter and spring.**

The effect of dissolved oxygen (D.O.) in the Colville WWTP effluent was evaluated using the QUAL2E model. The assumption for effluent D.O. used in the 1997 Ecology report is valid, with 3.0 mg/l D.O. being representative of effluent from an extended aeration activated sludge plant without effluent reaeration. Using the QUAL2E model, from November - February and March - May, the diurnal minimum D.O. in the river is consistently higher than the Class A standard of 8.0 mg/l. For these periods, Colville WWTP effluent D.O. of 3.0 is predicted to protect this standard under the critical conditions described in the Ecology publication (including 7Q29 river flow).

The model runs described above in determining allowable ammonia load were all done with an effluent D.O. from the Colville WWTP of 3.0 mg/l. Ammonia levels which could be met with the proposed facilities were found protective of the D.O. standard, so additional runs with variable D.O. were not necessary.



## Memorandum

To: Ken Merrill

From: Mark Esvelt, P.E.

Date: 05/17/01

Re: Colville WWTP, November-February Effluent Limits

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Thank you for allowing us the opportunity to respond to the apparent discrepancy between our recommended November-March permit limits (Esvelt memorandum to Mark Freiburger, 2/01/01 revised 3/22/01, included in 4/4/01 insert package for Colville Wastewater Facilities Plan) and the ones shown in Ecology's Colville River Water Quality Report, 01/97.

I have found two reasons for the difference in allowable loads from the Colville treatment plant, outlined in the paragraphs below. I believe that the recommendations presented in our earlier memorandum are protective of water quality standards, including margin of safety at least as great as recommended in Ecology guidelines.

I was able to duplicate Greg Pelletier's model results for the conditions summarized in Table 20 of the Ecology Report, so I am confident that we are using the same model. The differences in allowable load are the result of the following two issues.

1. Table 20 of the ecology report apparently used two different flows in converting from concentration (mg/l) to mass (pound per day). For example, the November through February loads shown on Table 20 for the Colville WWTP (eighth line down) show 15 mg/l BOD<sub>5</sub> and 7.5 mg/l NH<sub>3</sub>-N. To convert to pounds per day, it appears that a flow of 1.2 mgd was used for the BOD<sub>5</sub> load, and 1.8 mgd was used for the ammonia load. I do not know what the reasoning was behind using different flows for different constituents, when only one flow was used as the model input. I was able to duplicate this model run, and found that model output (resulting in the allowable concentrations shown in Table 20) were arrived at using the 1.8 mgd. It would seem to me that converting to pounds per day should use 1.8 mgd for both BOD<sub>5</sub> and Ammonia, as this would reflect the actual pounds per day modeled. Using this method, the loading would be 225 ppd BOD<sub>5</sub> and 113 ppd ammonia nitrogen.
2. The models run by Greg Pelletier for the Ecology report had maximum daily concentrations for Chewelah and Colville occurring simultaneously. In my re-run of the model, I used maximum monthly design concentrations for Chewelah, taken from the Chewelah Facilities plan as part of the background input. I then

found maximum daily concentrations allowable for these conditions for Colville. This seemed to be the most reasonable approach, because it is not possible for the maximum daily effluent concentrations from the Chewelah plant to transmit directly to conditions at the Colville plant. Travel time between Chewelah and Colville at the low river flows modeled is at least 1.5-2.0 days. Meteorological events could cause maximum daily effluent at both plants simultaneously (i.e. extreme precipitation event), but the river at Colville would not be affected at the same time. The effects of the Chewelah maximum day would be at least 1.5 days behind the Colville discharge. Perhaps more importantly, the longitudinal dispersion occurring in the stream for the 24 miles between Chewelah and Colville discharges is not accurately represented by the QUAL2E model. QUAL2E models the discharges and the river in steady state. In actuality, a maximum daily discharge would be followed by, and be preceded by, days of lower emissions, thereby maintaining consistency with maximum weekly and maximum monthly averages. A spike in effluent emission rate will be mitigated by the longitudinal dispersion.

I believe that the recommended concentration limits presented in our earlier memo are fully protective of the water quality standards. The margin of safety in protection of water quality standards is greater than Ecology's guidelines for all flows. Please refer to the earlier memo for discussion on margin of safety.